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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/057,733	01/23/2002	Masateru Tadakuma	FURUK.004AUS	2791
20995	7590	12/19/2003	EXAMINER	
KNOBBE MARTENS OLSON & BEAR LLP			MACCHIAROLO, PETER J	
2040 MAIN STREET			ART UNIT	
FOURTEENTH FLOOR			PAPER NUMBER	
IRVINE, CA 92614			2875	

DATE MAILED: 12/19/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/057,733	TADAKUMA ET AL.	
	Examiner	Art Unit	
	Peter J Macchiarolo	2875	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☒ Claim(s) 1,13,26,27 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
 a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>0402</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on April 23, 2002 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

Drawings

3. The drawings are objected to because of the following informalities:
4. Figure 3A doesn't have a labeled x-axis.
5. Figure 5 shows a waveform converter 500. The Examiner interprets this reference numeral as "50" which is supported in the specification.
6. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

7. Claims 1, 13, 26, and 27 are objected to because of the following informalities:

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8. The claim structure used by Applicant does not conform to standard U.S. practice, and is difficult to interpret. Specifically, the claims do not clearly contain a preamble, a transitional word, or a main body. The multiple occurrences of the word “comprising” further inhibit proper comprehension of the claim’s structure. See MPEP §608.01(m). The Examiner recommends the following claim structure:

[Preamble] [transitional word]:

[limitation X];

[limitation Y]; and

[limitation Z].

9. The Examiner is therefore interpreting the preamble of claim 26 to be, “A device...said waveform converter comprising:” The preamble of claim 27 is interpreted as, “A method...said method comprising,” Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 2 and 15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

11. Applicant recites “a plurality of optical fibers” in line 2 and line 3 of claim 2. Where a claim directed to a device can be read to include the same element twice, it is considered indefinite. *Ex parte Kristensen*, 10 USPQ2d 1701 (Bd. Pat. App. & Inter. 1989). It is not clear if

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the claim refers to an additional set of optical fibers, or the same optical fibers previously claimed. The Examiner is interpreting the claim to recite only one set of fibers.

12. Applicant recites, “a first optical circulator coupled to a first of said nonlinear elements, a first of said chirped fiber gratings, and a second of said nonlinear elements, and a second optical circulator coupled to said second nonlinear element, and a second of said chirped fiber gratings.” This is not clear. The Examiner is interpreting this limitation to indicate that the fiber gratings are coupled to optical circulators.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. Claims 1, 6, 7, 9, 10, and 13, are rejected under 35 U.S.C. 102(b) as being anticipated by Shigematsu et al (USPN 5,694,239; “Shigematsu”).

14. In regards to claims 1, 6, 7, 9, 10, and 13 Shigematsu discloses in figure 2, a coupled plurality of optical elements, comprising an optical pulse input port (101), a nonlinear optical element (100), a dispersive optical element (100), a wavelength selecting optical element (600), an optical pulse output port (302), and an optical amplifier (500), arranged in the order of input port, nonlinear optical element/dispersive optical element, wavelength selection optical element, and output port¹.

¹ Shigematsu, col. 2, ll. 37-43.

15. Claims 1, 6, 9, 12, 24-26 are rejected under 35 U.S.C. 102(b) as being anticipated by Watanabe (USPN 5,798,853; "Watanabe").

16. In regards to claims 1, 6, 9, 12, 24-26 Watanabe discloses in figure 12, a waveform converter, comprising an optical pulse input port (input), a nonlinear optical element (optical amplifier 91 having an Er-doped fiber), a dispersive optical element (96), a wavelength selecting optical element (band pass filter 97), an optical pulse output port (output), and an optical amplifier (98), arranged in the order of input port, nonlinear optical element, dispersive optical element, wavelength selection optical element, and output port². Watanabe further discloses in figure 13 and 15, that the signal light source is characterized by a temporal waveform and has wavelength content, and the waveform converter is configured to the output of the light source, and further that the pulses from the waveform converter (B) have a center wavelength closer to 1550 nm than the center wavelength of the modulated input signal light source (C).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

17. Claims 2-5, 8, 11 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shigematsu.

18. In regards to claims 2-4, and 16-18 Shigematsu discloses all of the recited limitations of claim 1 (above). Shigematsu further shows that the dispersion element is a single-mode fiber (SMF) with a frequency dependent propagation constant.

19. Shigematsu is silent to the dispersion element comprising a plurality of optical fibers having different nonlinear coefficients and dispersion characteristics, and the fibers having different nonlinear coefficients and dispersion characteristics are alternately disposed and have different lengths.

20. However, having multiple SMF's with the above configuration is a matter of obvious design choice, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Pater Co. v. Bemis Co.*, 193 USPQ 8. Further, one of ordinary skill in the art will appreciate that the optical fibers should have different nonlinear coefficients and dispersion characteristics of different lengths and alternately disposed, since this configuration is essential for optical stability in coupled optical elements.

21. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the coupled optical elements of Shigematsu, including multiple fibers having different nonlinear coefficients and dispersion characteristics, since this is an obvious matter of design choice.

22. In regards to claim 5, Shigematsu discloses all of the recited limitations of claim 1 (above). Shigematsu is silent to the specific nonlinear coefficient of the nonlinear element.

² Shigematsu, col. 2, ll. 37-43.

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23. However, having a nonlinear element with a coefficient of $5.0 \text{ W}^{-1} \text{ km}^{-1}$ or larger is a matter of obvious design choice, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233.

24. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the coupled optical elements of Shigematsu, including the nonlinear element having a coefficient of $5.0 \text{ W}^{-1} \text{ km}^{-1}$ or larger, since discovering the optimum or workable ranges involves only routine skill in the art.

25. In regards to claims 8 and 11, Shigematsu teaches all of the recited limitations of claims 7 and 1 (above).

26. Shigematsu is silent to the single optical medium comprising a chirped fiber Bragg grating.

27. However, using a chirped fiber Bragg grating for dispersion and filtering processes is well known in the art. It is further known that this configuration allows for compactness, robustness, and system efficiency.

28. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the coupled optical elements of Shigematsu, including using a chirped fiber Bragg grating for the single optical medium, since this configuration is well known in the art.

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29. Claims 14 and 15 are rejected under 35 U.S.C. 103(a) as being obvious over Feng et al (USPN 5,982,963; "Feng").

30. In regards to claims 14 and 15, Feng discloses in figure 4, an optical pulse waveform converter comprising a nonlinear element (406) and a chirped fiber grating element (406), and an optical circulator coupled to the chirped fiber grating.

31. Feng is silent to the optical pulse waveform converter having a plurality of nonlinear elements and chirped fiber grating elements.

32. However, having multiple nonlinear elements and chirped fiber grating elements is a matter of obvious design choice, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art. *St. Regis Pater Co. v. Bemis Co.*, 193 USPQ 8. Further, one of ordinary skill in the art will appreciate that this configuration is essential for optical stability in coupled optical elements.

33. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the waveform converter of Feng, including multiple nonlinear elements and chirped fiber grating elements, since it has been held that mere duplication of the essential working parts of a device involves only routine skill in the art, and further this configuration is essential for optical stability in coupled optical elements.

34. The Examiner notes that the limitations in claim 14, "for exerting...pulse" and, "for exerting a dispersion effect...of an optical pulse." are intended use type limitations. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the

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claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

35. Claims 19-23 and 27 are rejected under 35 U.S.C. 103(a) as being obvious over Watanabe.

36. In regards to claims 19-23 and 27, Watanabe discloses the waveform converter of claims 24-26 (above).

37. While Watanabe is silent to a method of using such a device, the steps of spreading the optical spectrum of said first optical pulse, selecting a second wavelength from said spread optical spectrum, and filtering wavelengths outside of a selected wavelength band around said second wavelength band so as to produce a second optical pulse having an optical spectrum centered approximately at said second wavelength is a very broad and obvious method of using. Hence, the structure disclosed by Watanabe meets Applicant's recited method step limitations.

38. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to construct the waveform converter of Watanabe, and using it with the method of claim 19-23, and 27, since the method steps are obvious in light of the resultant structure.

Conclusion

39. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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40. U.S. Patent 5,499,134 to Galvanauskas et al is evidence that using a chirped fiber Bragg grating is well known in the art³.

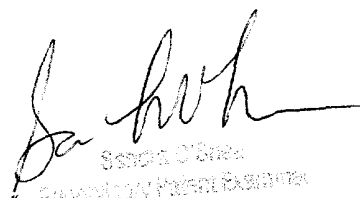
41. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter J Macchiarolo whose telephone number is (703) 305-7198.

The examiner can normally be reached on 8 - 4:30, M-F.

42. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (703) 305-4939. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

43. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

pjm



Sandra O'Shea
Supervisory Patent Examiner
Technology Center 2875

³ Galvanauskas, col. 2 line 66 to col. 3, line 6.